CONCEPTUAL STUDIES AND ANALYSIS ON OLFACTORY MUCOSA OF SOME FISHES LIVING STATUS

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Summary / Abstract

Variety in histochemical eccentricity of the olfactory mucosa was read for limitation of axons, mucopolysaccharides, glycogen, protein and lipid in schilbid catfish, Eutropiichthys vacha (Hamilton, 1822). Silver affidavit was distinguished in the plenitude of receptor cells in the olfactosensory epithelium and well as set apart in the handle and dendrite cycle of essential receptor cells. The mucous cells with different phases of development containing various levels of mucopolysaccharides were distinguished by utilizing the Periodic Acid Schiff's (PAS) response in mix with Alcian Blue (AB) test. This joined test bestowed purple tone because of PAS for nonpartisan mucin and blue tone for AB response because of the presence of corrosive mucin solely. The aftereffects of Best's carmine test demonstrated extensive measure of glycogen present in the receptor cells, basal cells and supporting cells in the olfactory mucosa. Essential protein and bound lipid were found out in the different cells of the epithelial covering and in platelets of the focal center were examined with conduct exercises of the fish intrigued.

1. Introduction

In this research proposal on conceptual studies and analysis on olfactory mucosa of some fishes living status. The morphology and anatomy the olfactory part in fish along different orderly and modes of life are considered, as well as the cellular formation of the olfactory epithelium, the production of the olfactory bulb and the olfactory tract. The basic operative parameters of the olfactory method are presented : spectra, sensibility, the speep of combination, nature and the root of olfactory indicators, their modern taxonomy, basic methodologies in order to the study of olfactory guideline in fish and their capability to determine the personal, group, population and variant identity of personals is systematized. The role of the olfactory obtainment in reproductive, paternal, feeding, defensive olfactory part in ontogeny is traced, and the precondition of the countenance and growth of responses to different natural chemical stimuli are determinate. The sensitivity of the olfactory part to unassertive empact of chemical pollutants is shown. Date are submitted on the dynamics of regenesis processes, specifically regard realization of the olfactory method after intence of chemical pollutants.

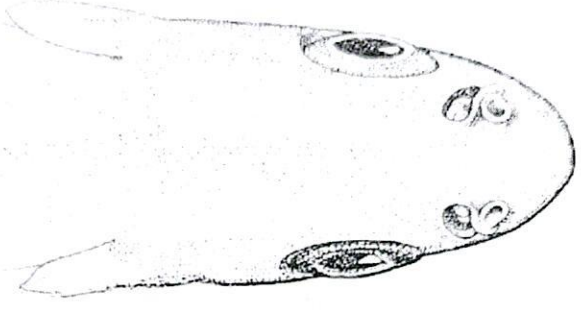

Fig. 1. Lateral View

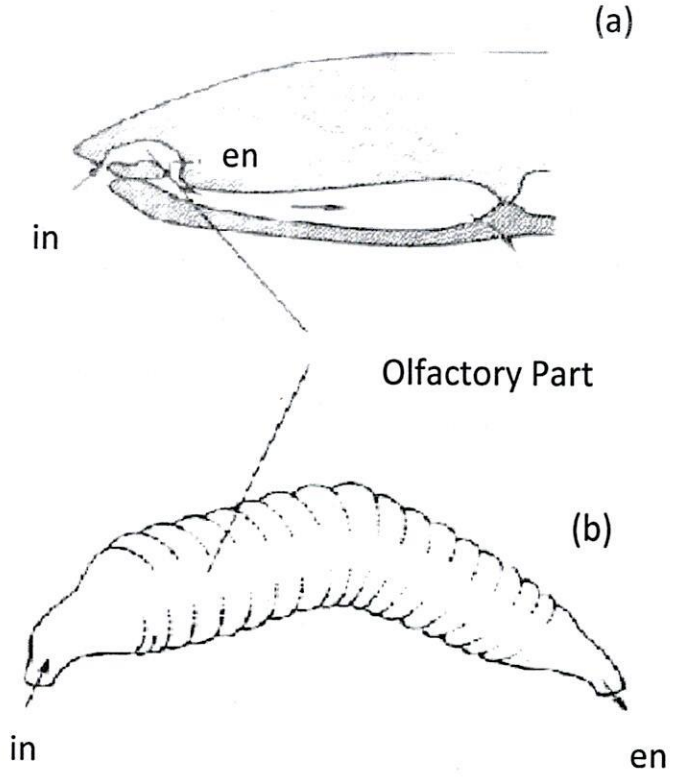

Fig . 2. (a) Head (sagittal section)

(b) olfactory Part. "in" anterior olfactory opening, "en" posterior olfactory opening

2. Literature Review

Statement of the Problem :

This work has been undertaken to preserve the present knowledge. After an extensive and intensive review work, it was found that a considerable amount of research works have been carried out with conceptual studies and analysis on olfactory mucosa of fishes living status.

Olfaction is quite possibly the most prominent sense driving the essential sorts of conduct in teleosts for correspondence with the amphibian climate. It is critical in fish taking an interest in endurance connected exercises like taking care of, relocations, home discovering, conceptive methodologies, parental conduct and dismay response to caution substance (Camacho et al., 2010). Olfactory prompts are learned by a couple of olfactory organs associated with the olfactory projections of the cerebrum and relevant mentalities are delivered in some random species (Mana and Kawamura, 2002).

Lately, a far and wide fascination has been displayed by scientists on morphology, underlying association and capacity of the olfactory organ to comprehend the component of olfaction in teleosts. Cell components and their synthetic constituents imagining the olfactory framework are basic to explanation of olfactory capacity. Insufficient investigations have been made on histochemistry of the olfactory epithelium of fish (Singh and Singh, 1987; Pastor et al., 1991; Saito et al., 2004; Bettini et al., 2009; Ghosh and Chakrabarti, 2012, 2015; Kim et al., 2019) to limit the compound characteristic in various cell types.

Taking into account the lack of information with respect to the substance nature and practical meaning of assorted cells coating the olfactory mucosa of schilbid catfishes corresponding to method of everyday routine and experiencing, the current work has been embraced on Eutropiichthys vacha (Hamilton, 1822) (Actinopterygii: Siluriformes: Schilbeidae), a carnivore surface feeder which benefits from bugs, scavangers, rotifers, mollusks and little fishes (Talwar and Jhingran, 1991; Nath, 1994).

Sensory system, as a process of which teleost fishes respond to diverse stimuli in aquatic milieu, largely is classified into mechano- and chemo- receptions by their differences in a route of innervations, a passage of signal transduction cascade, and a type of stimulation (Hara 1986; Okada 2015). Among them, the olfaction is one of chemoreception that senses only a mixed aquatic compound such as hazard molecules, hormones, bile acid and amino acids dissolved in animal's habitat, through the dendrites of olfactory receptor neurons (ORNs) to contact the surface of the epithelia (Hara 1994; Hanson et al. 1998).

In particular, the signaling of olfaction commences in contact with the ORNs over lamellae of the olfactory chamber and with inflowing water with odors (Hara 1986; Kasumyan 2004). So, the anatomy and histology of the olfactory organ seems to be important in fishes, which are affected by the olfaction, swimming pattern, water volume, bottom structure and water turbidity in habitats (Ferrando et al. 2016; Kim et al. 2016). Sometimes, the olfactory organ has been regarded the archetype for the morphological adaptation to fish-owned lifestyle (Kim and Park 2016; Malick et al. 2018).

3. Methodology

Methodology of the research work

Specification : "The conceptual studies and analysis on olfactory mucosa of some fishes living status."

The study will be competed on the following methods :

i. The study will be completed in the form of experimental method.
ii. The methods to be used.
iii. Various technics needed for this work.
iv. Measurement of quality will be measured by conductivity.

The olfactory process in beast comprises a highly specialized sensual organ for detection and recognition of minute amount of chemicals in the environment.

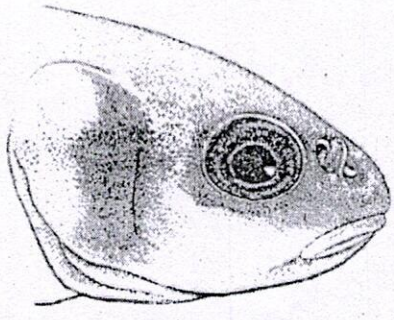

Fig. 3. Lateral view

Experimental Method

Experimental studies own documented the part played before olfactory particulars in social relationships, quarry or predator identification and the search being food. The demands inflict by the aquatic habitat have build the olfactory equipment of fish a sensual system

with numerous specialized features. At present at best a few possessions of the fish olfactory organ have been investigated.

Mateiral and Method

Sample Collection :

A total of 24 adult specimens of both sexes E. vacha (measured 22±2.07 cm in total length) were captured from the river Ganga around Kalyani, West Bengal. The specimens were deeply anaesthetized with benzocaine (4 mg/L) and the olfactory organs were carefully.

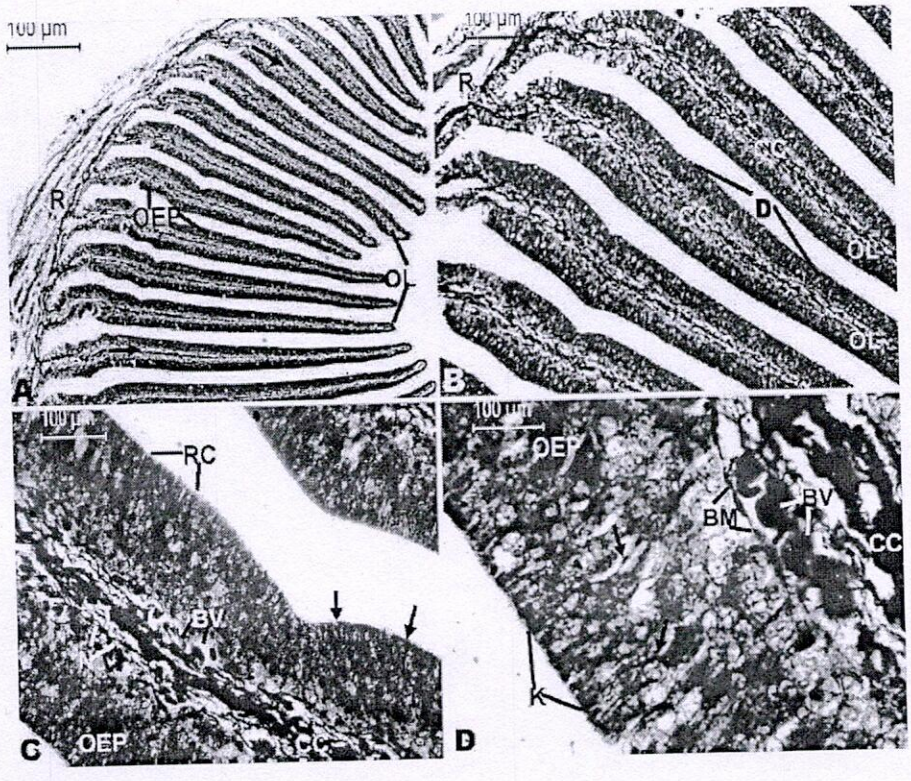

Figure 4. Photomicrographs of transverse sections of olfactory epithelium of Eutropiichthys vacha showing silver deposition in the neurons by Silver Impregnation Method (SIM).

(A) Olfactory lamellae (OL) showing silver deposition in olfactory epithelium (OEP) and central core (CC) (arrows) radiated from raphe (R) (40X).

(B) Showing silver reaction in the axonal processes of different receptor cells (D) lining the epithelium of OL. Note positive reaction in nerve fascicles of CC (100X).

(C) Showing intense silver reaction in axonal processes of ciliated receptor cells (RC) and rod cells (arrows) of OEP. Note strong reaction in nerve fibres (N) and blood vessels (BV) in CC (400X).

(D) Maximum localization of silver staining in primary RC with knob like structure (K) and synaptic contact in between primary and secondary RC (arrows) of OEP. Note intense silver staining in basement membrane (BM) and BV in CC (SIM) (1000X). excised from the floor of the nasal cavity under a Zeiss Stemi 2000-C stereoscopic binocular microscope.

Techniques

Histochemical Analysis :

Olfactory tissues were fixed in 10% unbiased formalin for 16-18 h. After obsession, the tissues were washed well in 70% ethanol and dried out in reviewed ethanol series. The tissues were cleared in methyl benzoate and handled for paraffin inserting. Areas were cut as 8-10 □m thick utilizing a turning microtome (Weswox MT-1090A) and continue for Silver Impregnation Method (SIM) for identification of axons (Marsland et al., 1954), Periodic Acid Schiff's (PAS) response in mix with Alcian Blue (AB) (PAS-AB) for discovery of unbiased and corrosive mucins (Mowry, 1956), Best's Carmine (BC) technique for recognition of glycogen (Best, 1906), Mercury-Bromphenol Blue (MBB) strategy for location of fundamental protein (Mazia et al., 1953) and Acetone Sudan Black (ASB) technique for identification of bound lipid (Berenbaum, 1958). Every one of the slides were noticed and shot utilizing a Leica EC3 light magnifying lens at various amplifications.

4. Proposed Analyses

In this research mainly studies and analysis on olfactory nucosa of some fishes. The sense of smell, or olfaction, is the specific sense through with smells are perceived. The cognition of smell has many functions, inclusive detecting hazards and pheromones, and plays role test. The olfactory system is the system concerned to the cognition of smell (olfaction) many fish activities are dependent on olfaction, such as : concurrency, discriminating kin, avoiding carnivore location food, confinement avoidance, implant and centering. Olfactory toxicity can appear by different, complex modes of harmful action.

The olfactory system, or sense of scent is the sensational system used for smelling (olfaction). Olfaction is one of the specific senses, that have directly related specific organs.

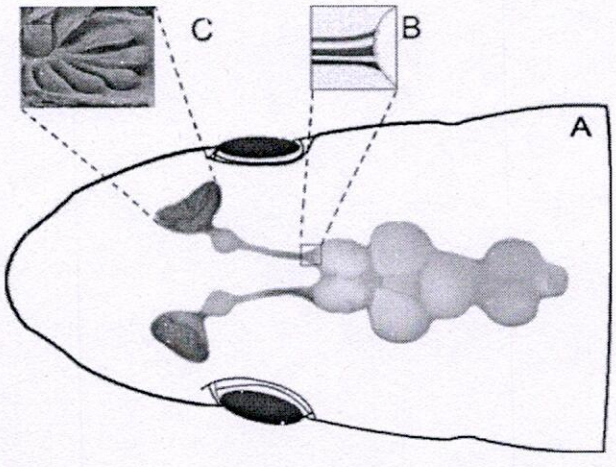

Fig. 5. Fish Olfactory System

Extreme raptiles mammals and mammals have a main olfactory system with accessory olfactory system.

The olfactory system can be separated into two main components :

(i) The prime olfactory system which consists of the prime olfactory epithelium in the nasal cavity where transduction epithelium in the nasopharynx where transduction of vaporous odors occurs, and the main olfactory bulb with its relations constituent of the brain.

(ii) The accessory olfactory system consist of the vomeronasal organ where transduction of nonvolatilesable pheromones occurs, with the accessory olfactory bulb and its relations further brain areas. The accessory olfactory system plays a specially robust part regulating many ways of animal behavior, yet its junction in humans residue conjectural. This paper review physiological, anatomical and functional aspects of these two aliment of the olfactory system.

5. Limitations & Delimitations

(i) In the research it has been tried to furnish the important results in this area and further scope for the study in future.

(ii) Limitation relate to the validity and reliability of the conceptual studies.

(iii) Delimitation refer to the boundaries of the research study based on our decision.

6. Time Frame of Dissertation

Min. Duration : 3 Years (Including Course work) and

Max. Duration : 6 years

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8. Appendices

Publication by the Scholar related to his Thesis problem.

List of Papers Published:

Sr. No.	Title of Paper	Details of Journal / Conference Proceeding	ISSN / ISBN No.	Month & Year of Publication
1	"Anatomy, Ultrastructure and Histology of the Olfactory organ of the Largemouth Bass Micropterus Salmoides, Centrarchidae "	(ICESD – 2021) IJIERM – VIII-IV	2348-4918	June 2021 Vol. 08 Special Issue 04
2	"Structural Diversity of Olfactory organs In Osteolossiformes"	(IC-LLCP-2021) AJEEE	2456-1037	July 2021 Vol. 06 Special Issue 05
3	"Conceptual Studies and Analysis on Olfactory Mucosa of Some Fishes Living Status"	(IC-MTSBEMET-2021) 05 IJIERNI-VIII-V	2348-4918	July 2021 Vol. 08 Special Issue 05

4	"Analysis on Some Fisher Olfactory System"	Relationship Between Agriculture and Industry	978-93-89522-38-9	First Edition 2020

Sudharsan Selvaraj

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Signature of the Supervisor &
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